Sudan Journal of Medical Sciences
Volume 17, Issue no. 1, DOI 10.18502/sjms.v17i1.10688
Production and Hosting by Knowledge E

Original Article

Medical Education Research Priorities for Master's Students in Sudan: A Qualitative Study

Amira Burhan[1,2]

[1]University of Khartoum, Khartoum, Sudan
[2]Soba University Hospital, Khartoum, Sudan
ORCID:
Amira Burhan: https://orcid.org/0000-0002-2479-5675

Abstract

Background: Believing research prioritization can increase the research value and augment advances in the scientific base of any profession, this study aimed to identify research priorities relevant for medical education in Sudan.

Methods: The study was designed to capture a qualitative exploration of multiple stakeholders' opinions. Data were collected from two stakeholder groups: experts and students of medical education in Sudan. Semi-structured individual interviews and focus groups from 10 experts and 41 learners were incorporated. The categories and subcategories, derived from experts' data inductively through constant comparison, enhanced the development of a coding framework. This framework was used deductively to analyze the beliefs and opinions of the learners leading to a list that exemplifies priorities for medical education research.

Results: A set of seven principal and three minor themes were identified, the principal themes were: Curriculum Content, Design, and Delivery; Faculty Development; Assessment Methods; Research; Accreditation, Evaluation, and Quality; Professionalism; and Student Selection and Support. Four themes were identified to justify participants' selections: Quality education and patient care; Accreditation of schools; Curricula contextualization; and Documentation of success stories.

Conclusion: This instrumental research fulfilled its aim to mount a set of medical education research priorities grounded in collected perceptions with optimal stakeholder engagement. Importantly, there were many more similarities than differences between these findings and those from other countries which suggests that some topics are relevant across the international arena and one may propose the commencements of an international medical education agenda.

Keywords: medical education, master students, research priorities, priority setting, Sudan

Corresponding Author: Amira Burhan; email: burhan_amira@yahoo.com

Received 27 May 2021
Accepted 28 January 2022
Published 31 March 2022

Production and Hosting by Knowledge E

Editor-in-Chief:
Prof. Mohammad A. M. Ibnouf

OPEN ACCESS

1. Introduction

Medical Education (ME) in Sudan has developed gradually since 1924 and enjoys an international and regional reputation of excellence [1]. More recently, from the 1990s onward, it has experienced a considerable expansion, almost synchronous with that in the Mediterranean region [2, 3]. In 2007, Fahal called for greater emphasis on quality assurance [1], and in 2018 Karrar reported how larger student intake per school posed challenges requiring increased educational resources and capacity if this reputation is to be maintained and echoed [4]. The occasioned rapidly growing culture of change in Sudan's ME community was not informed by allied Medical Education Research (MER). We believe that now might be the ideal opportunity to utilize a parallel growth in ME programs with mandatory research requirements and feed local reform.

Sudan Medical Council (SMC), the regulatory body for medical practice and ME in Sudan, is undertaking measures to enhance the quality [5]. Moreover, in response to international appraisal and calls for accrediting the accreditors [6], SMC was the 10th accrediting agency to be awarded recognition status by the World Federation of Medical Education in 2018 [7]. Noticeably, there is an accompanying curricula reform and evaluation as steps in the accreditation processes, ME courses are being launched and promoted, and stress is being placed upon enhancement of quality assurance, with a rising trend toward installing modern educational concepts and contents. However, only sporadic MER activities are being published. Greysen *et al.*'s review on ME in sub-Saharan Africa (SSA) showed that while Sudan accommodates 23% of SSA's medical schools, it is grossly under-represented in the current ME literature by only 2% share [8].

Research could be done to study and disseminate ME reform [9], it would thwart the impending downfall of such a well-established ME community. Educational research provides evidence for educational bodies, teachers, and policymakers in their methods and approaches and ensures the medical practice is aligned with health needs [10]. Since the growing trend of ME courses is toward Masters' degrees with mandatory research requirements, we believe optimizing these activities could strengthen future MER in Sudan. It is important to ensure researchers' priorities align with those of research end-users [11]. Considering limited monetary and human resources in developing countries is logical to ensure this alignment as a key component to lessen waste in research investment [12]. Such evidence-based alignment will increase the value, foster scientific advance [13, 14], and support positive research culture [10].

Research prioritization is a process of identification of research needs, potential research areas, topics, questions, and proposals to be conducted; to achieve the maximum of research efforts and enhance quality through a fair, transparent, and systematic approach [15]. The underlying principle is that all research activities could be carried out with the intent to inform the community and contribute to the national/international evidence. Although ME in Sudan is an inveterate discipline, MER is a relatively young subject that needs care and attention. A local and contextual prioritization may increase the likelihood of eliciting meaningful impact from research [16].

Relatively few Priority-setting Exercises (PSE)s have been published for MER. We could identify only eight published international PSE for MER at the time of this research. We reviewed and compared these across developed and developing countries. Whilst sharing the same driving aim, the methodology and the resultant priorities were sometimes diverse. All studies utilized qualitative or mixed research methodologies – mostly consensus methods. Regarding the products, some priorities were matching with many notable dissimilarities, probably reflecting differences between countries in socioeconomic and cultural metamorphoses, societal expectations, and healthcare systems. The need to inspire systematic and strategic actions to determine research priorities for ME at the national levels looks obvious [17].

Three PSE for MER from the developed countries were reviewed, the one from New Zealand aimed to identify national priorities that could benefit from cross-institutional collaboration [18]. Another was a national scan in Canada, where a team of researchers gathered perspectives of key informants on important issues relevant to the future of undergraduate ME [19]. In the third activity, members of the Scottish MER consortium conducted a national two-stage online questionnaire study to set priorities for MER in Scotland involving a large range of key stakeholders to ensure wise allocation of financial resources [14].

From developing countries, the reviewed PSEs were all Iranian publications, one was conducted by Iranian researchers to set MER priorities for the Eastern Mediterranean Region countries [17], while the other two were local studies [10, 15]. No MER prioritization conducted by researchers from other developing countries could be retrieved from the international literature. Two specific PSE were also reviewed, one aimed to identify national dental education research priorities, barriers, and enablers in Scotland [13], the second aimed to identify the international research priorities for medical nutrition education and involved different stakeholder groups worldwide [16].

Our search did not identify any MER prioritization for Sudan. The current study aimed to address this gap in the literature by creating a research prioritization process. It is

an enterprise to enable new Sudanese researchers conducting studies required for their Masters' degree to reach informed choices about their research topics. The study findings are likely to guide future research projects, demonstrate how Sudan could recognize and share a set of research priorities to inform the growing number of ME programs, promote educational reform and decisions, and contribute to the international MER community.

1.1. Study objectives

1.1.1. General objectives

(i) To identify the priorities for ME research to be conducted by Master's students to affect a positive impact on the healthcare system in Sudan and the region.

1.1.2. Specific objectives

(ii) To identify the currently emerging priorities for ME researches conducted by graduate master students.

(iii) To identify the priorities for ME research considered by the policymakers, course designers, and educators.

(iv) To identify the priorities for ME research considered by the next generation of ME researchers.

(v) To determine the reasons for the selection of these research priorities.

2. Materials and Methods

2.1. Study design

Our exploratory research aimed to understand multiple perspectives through the transactional construction of the participants' opinions. So this research is epistemologically grounded in social constructionism, aligned with a relativist ontology that views reality as socially negotiated or assembled, with diverse subjective ways of conceiving knowledge [20, 21]. The constructivist epistemology considers knowledge as the product of human interactions, actively co-created from shared experiences and relations between participants and researchers [22]. This is contrasting to the positivist paradigm where

the assumption is that a single reality exists which could be captured objectively by disconnected researchers [23].

This instrumental research was designed to inductively build an effective tool grounded in collected perceptions and conclude by mounting a list of research priorities [24]. The inquiry was undertaken in its natural settings in a similar way as the naturalistic inquiry proposed by Lincoln and Guba in 1985, using qualitative methods relevant to the what and why questions, purposive sampling, inductive analysis, and adopting special criteria of trustworthiness [25].

The initial stage of descriptive documentary analysis used manual content analysis to explore what has already been researched by alumnae of these programs.

2.2. Study participants

Two groups of participants were purposefully selected, they were reasoned supreme to provide relevant, rich information – experts and learners.

2.2.1. Experts

Master's program leaders and trainers, course designers, ME researchers, and some pioneers in ME reform knowledgeable about the context of ME in Sudan and globally were selected. These expert participants have highly relevant expertise in setting research priorities. The inclusion of their perspective would add great value to the study, and was considered likely to increase the confidence of the new researchers about the outcome [14].

2.2.2. Learners

Current students enrolled in two leading Master's programs (Health Profession Education Master/PhD – University of Gezira and Master in Health Profession Education – The University of Khartoum as trainees. These were considered well-informed about the healthcare system and ME in Sudan while representing different medical disciplines and health professions. Their collective opinion could make the best judgments about which areas of education and training have high priority for research in terms of healthcare needs and educational context. Considering the perspectives of these future researchers would arguably foster their ownership of the product [14].

2.3. Data collection methods, sampling technique, and recruitment

Individual semi-structured interviews and focus groups were selected as methods for data collection. Consensus methods were not used because our goal was to highlight the range of different viewpoints rather than reach a consensus [26]. These methods were favored because they could allow for better clarification and greater depth of participants' engagement [27]. Semi-structured forms of individual interviews and focus groups were adopted in this study, which represent a median stance between structured and unstructured discussions relating to the degree of control exerted by the researcher.

Individual qualitative in-depth interview was preferred to harness the knowledge and experience of the expert participants because grouping these senior busy educators is difficult to achieve, in addition, their opinion might be rich enough to be gathered individually [28]. The number of experts to be interviewed was not predetermined, nevertheless planned to reveal as the study progressed, aiming at either interviewing all experts, exhaustive sampling, or until reaching a point at which no new opinion is generated from the data, that is, saturation of data [29–31]. The initially selected participants provided a point of departure and suggested others after being interviewed (snowballing).

This iterative approach of going back and forth between sampling, data collection, and data analysis, rather than handling them as distinct stages in a linear process, is a key characteristic of qualitative research, valuable in enriching data collection [22, 32].

The focus group method was selected to collect data from learners, because the method permits thinking out loud with and building on the responses of those with analogous experience. Furthermore, it is practical in bringing together the opinion of a group in a shorter time [21]. A stratified sampling technique was followed to enroll four focus groups involving trainees from the two ME programs with research requirements at the time of data collection, two groups from each. Trainees were approached after seeking permission from their program heads. All learners were invited for voluntary participation. The date and time of the focus group were agreed on according to the participants' convenience.

The focus of all discussions was the participants' responses to a mini-questionnaire, with a single open-ended question based on the research objectives, it was designed by the researcher as a data collection tool. The aim of the study was explained in the mini-questionnaire, which also includes consenting informants on their participation and that the conversations were being audio-recorded for transcription and analysis.

2.4. Data management

All data gathered were audio-recorded and personally transcribed, which enabled familiarization with the datasets and enhanced comparison. Since the content of the data is being used for factual information, transcription was not meant to delve extensively nor to report pauses and silences. It was based on the words and phrases, with little attempt to show intonation, emphasis, and accents, unlike transcription of data for discourse analysis that aims to reveal the contained hidden messages or conversation analysis which focuses on the underlying structure and sequencing of talk [33].

To establish dependability, the original data, audio files, and transcripts were duplicated and a set was stored as a backup copy for review. In this way, they can be protected against any unintentional damage and can be later used as an archive for future research [33].

2.5. Data analysis

Constant comparison was selected to analyze individual interviews with experts and come out with a product that represents a basis for framework analysis of the data gathered from learners through focus groups. Constant comparison is a grounded theory type, interpretative analytical process of data designed to compare data segments and generate a theory [22, 28, 31]. It is a fundamental element of the grounded theory described by Glaser and Strauss where the main premise is that theory systematically emerges from, and is grounded in, data [34]. Mindful of the tool emerging from experts' opinions, framework analysis deductive coding was used to interpret data from focus groups. In this analytic approach, data collection is completed before analysis commences [35, 36], it is more explicit and can be assessed by others [37].

A combination of these approaches was employed as the analysis methodology to identify the recurrent and discordant views across data. For both methods, we started with conducting content analysis that implies the organization of data according to concepts into themes, it is essentially the first step of these commonly used thematic approaches. A transverse analysis followed through constant comparison and framework analysis and resulted in conceptual subthemes and themes. The process which was sharing methodologies for de-contextualization and then re-contextualization of two types of data are summarized in Figure **1**, which shows data and methods triangulation.

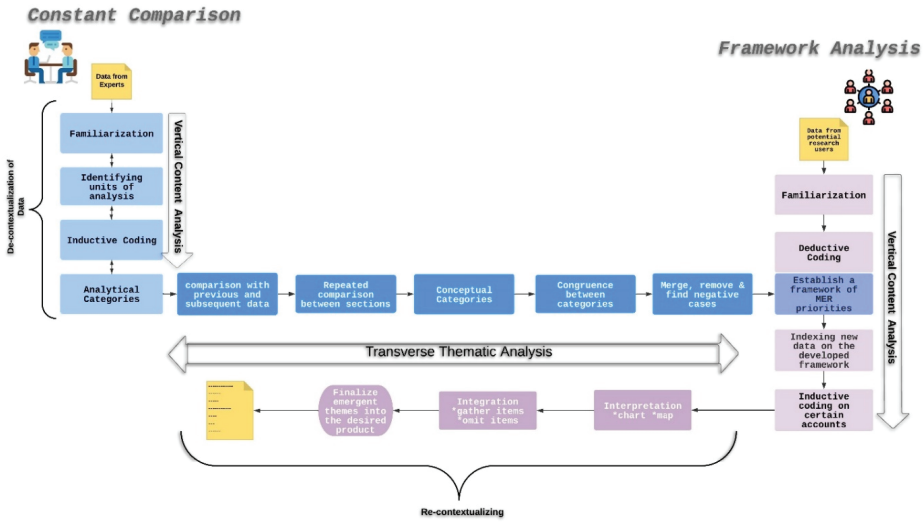

Figure 1: Overview of the Analysis Process – Vertical content analysis of both data sources and transverse thematic analysis (constant comparison for interview data and framework analysis for focus group data).

3. Results

3.1. Research conducted by ME Master's graduates

Simple content analysis of the registry of trainee research submissions [38] of Masters program1's alumnae, and the research list of first batch/program2 who had completed their research revealed 134 research topics. After extraction and coding, 13 subcategories emerged, these were categorized into four principal themes, shown in Figure **2**. Educational Methods was the most studied area, followed by Assessment Issues, Curriculum Design and Evaluation, and Students Admission Policy. Ten remaining studies were grouped into three different topics: Professionalism, faculty development, and educational environment and were categorized as Others.

To present the experts' and learners' opinions, we will display the emerging themes and subthemes with associated quotes of relevant verbatim comments. A common set of priorities generated from data triangulation will then be presented.

3.2. Experts' perspectives

A diverse group of educational experts included eight holding high academic positions who participated in semi-structured interviews. Saturation was achieved after the accomplishment of 10 interviews. Constant comparison identified 66 attributes representing the original data as in vivo codes which were compared continuously and inductively and

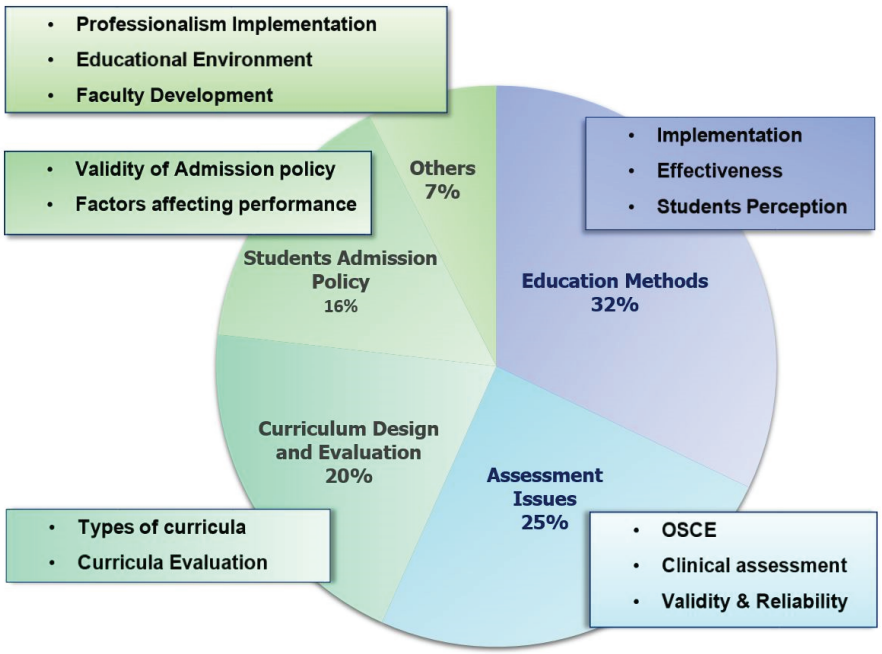

Figure 2: Themes researched by ME Master's graduates, their frequencies and included subthemes.

reduced into 40 descriptive codes that captured the significant ideas after omitting and integrating similar cases, keeping notes about code frequencies. These items covered a range of potential research areas in ME and were clustered and focused into nine conceptual categories or themes, six major, and three minor themes. The minor themes, those containing only one or two of the initial attributes, were retained to keep the full range of views, as our goal was to highlight the range of different perspectives.

The major themes identified are Curriculum Content, Design, and Delivery; Faculty Development; Assessment Methods; Research in Medicine and ME; Accreditation, Evaluation, and Quality Education; and Professionalism. As the links across categories and between codes were explored making relationships, most of the themes were seen to have some overlap with the theme of Faculty Development in one or more of their subthemes, and the Faculty Development theme appears central to the research priorities as demonstrated in Figure **3**, which highlights MER priorities as seen from experts' point of view.

3.3. Learners' perspectives

Four focus groups were created. From program1 (55 participants) and program2 (48 participants), 19 (35%) and 16 (33%) participants attended the focus group discussion,

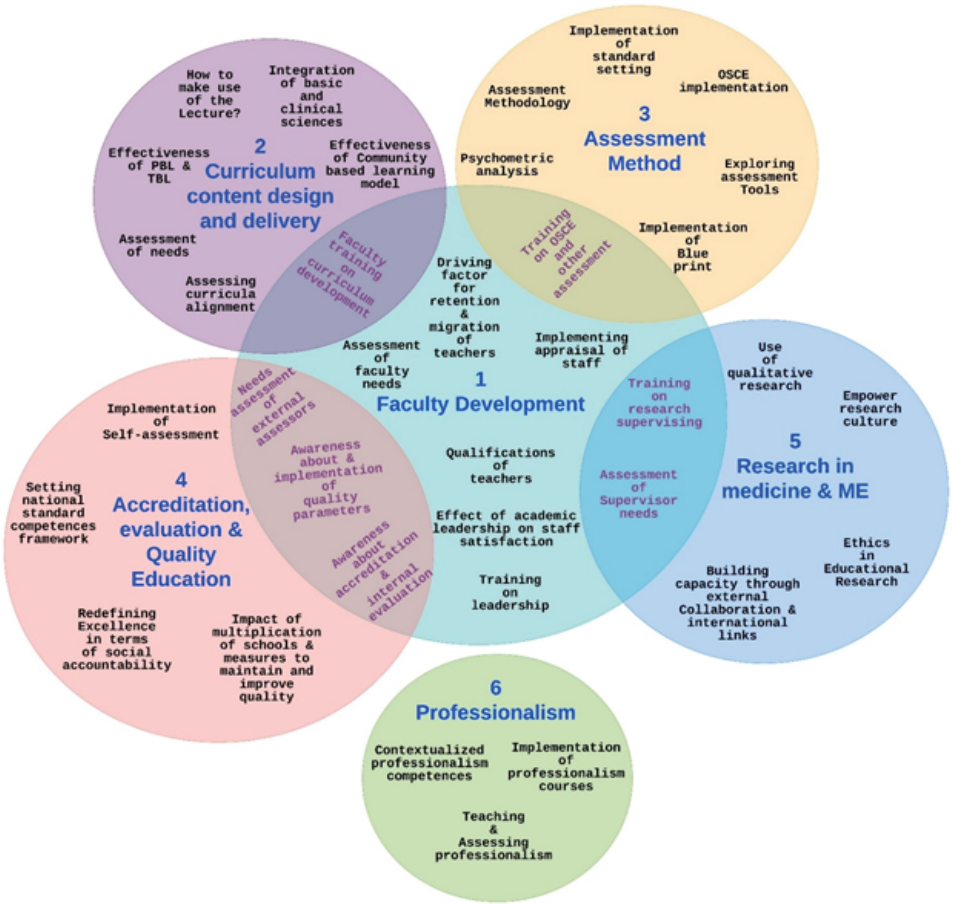

Figure 3: MER priorities from the experts' point of view: 6 principal themes, 36 subthemes. Faculty development appears central to the research priorities.

respectively. Each group utilized around 1 hr of discussion, carried out in the participants' educational environment.

The researcher's Insider position was helpful in this regard as it was easy to understand and translate the jargon, reconstruct sentence structure, and clean up the raw data without being stripped off of some of their meaning which would not be achieved by an outsider. Coding of data from focus groups identified 67 attributes as in vivo codes which were grouped into analytical categories. The identified categories acted as a taxonomy for individual codes to be placed, because data was not huge, this was done manually. These were deductively fitted into the previously developed framework of 40 subthemes arranged into 9 sets of themes that capture the significant ideas of experts. During this process, we needed to inductively generate 21 new subthemes or descriptive codes, most of them could be accommodated in the previously developed themes. A new major theme emerged due to the frequent appearance of related subcategories in the data. Figure **4** shows how the learners' perspectives overlap on the experts' framework.

Table 1: Illustrative quotes with relevant themes and subthemes: Experts' interviews.

Illustrative quotes	Themes (with subthemes in brackets)
"What concerns me is the integration as philosophy, innovations that help in making use of resources should be evaluated." (Interviewee 2)	**Curriculum Content Design and Delivery** (Integration of basic and clinical sciences)
"Unfortunately, we are losing experiences across the borders, we need to look on factors that help staff retention." (Interviewee 3)	**Faculty Development** (Driving factors for retention and migration)
"We are faced with a huge number of postgraduate ME students we need to look into research supervisors' training, how to help that." (Interviewee 7)	**Faculty Development** (Faculty training on research supervision)
"I always think of looking into ways to improve the research culture." (Interviewee 3)	**Research in Medicine and Medical Education** (Empower research culture)
"We need studies about the use of qualitative research in medical education." (Interviewee 9)	**Research in Medicine and Medical Education** (Use of qualitative research)
"Having a national standard is important, the model medical college is one of the areas which needs to be streamlined to identify models of curricula which could be or should be adopted by various schools." (Interviewee 6)	**Accreditation, Evaluation, and Quality Education** (Setting national standard competences framework)
"We have to think of simulation in ME, I feel it is not well utilized we could study what missed opportunities are there." (Interviewee 6)	**Simulation** (Developing innovative low cost simulation)
"We can observe that schools have quite good social accountability but not enough documentation. We need to look in the Social accountability of our medical schools." (Interviewee 5)	**Social Accountability of Medical Schools** (Documentation of social accountability)

3.4. Triangulation of data

The final set of MER priorities as an outcome of this study is what has emerged from merging experts' and learners' opinions, it accounts for seven principal themes and three minor ones. The 10 themes comprise 63 different subthemes that capture the perspectives of all participants and is shown in Table 3 below.

3.5. The Why themes

Participants were asked to express why they thought that the selected priorities were important. Four "Why themes" were identified as reasons for participants' perception, these were: Quality of education and patient care; accreditation of schools; and the need to contextualize curricula content and design and documentation of models and success stories.

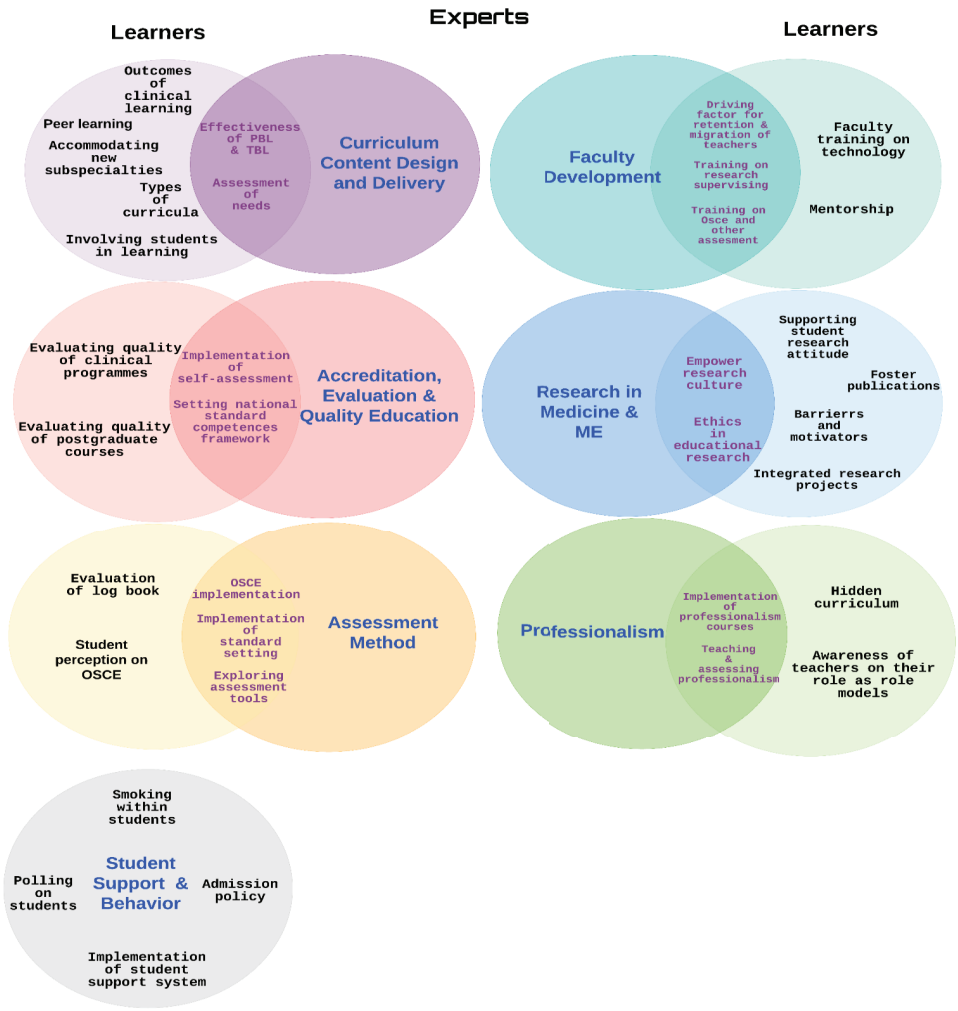

Figure 4: Framework Analysis; Fitting the codes evolved from the learners' opinions into the framework generated from experts' opinions. New subthemes and a single principal theme emerged.

4. Discussion

The study was a qualitative exploration of opinions, experiences, and concerns of those deeply interested in ME. The different positions of the expert participants added political, organizational, and strategic dimensions to the outcomes and diversity of the learner participants in age, sex, specialty, profession, geographic distribution, and institute of origin added broader representation of the whole country. Moreover, the intimate closeness of these learner participants to students and patients who are their direct customers gave us confidence that the final priorities selected do represent most of the main challenges facing ME in Sudan with optimal stakeholder engagement. We believe that the methodology adopting a qualitative naturalistic inquiry was well-aligned with the exploratory nature of the research. The use of semi-structured individual interviews and

Table 2: Illustrative quotes with relevant themes and subthemes: Learners' focused groups.

Illustrative quotes	Themes (with subthemes in brackets)
"Learning method that uses small groups, e.g., PBL and TBL should be compared and new methods tried." (Focus Group 2.1: Female-Associate professor)	**Curriculum Content Design and Delivery** (Effectiveness of PBL & TBL)
"Peer learning is common, it needs to be explored as a case study, and empowered." (Focus Group 1.1: Female-Assistant professor)	**Curriculum Content Design and Delivery** (Peer learning)
"OSCE, is it fit for purpose? how is it implemented? patient simulators are they trained?" (Focus Group 2.1: Male-Associate professor)	**Assessment Methods** (OSCE Implementation)
"Better to think on how to empower the research attitude in the teacher and also students, maybe we need to start early." (Focus Group 1.2: Female-Assistant professor)	**Research in Medicine and Medical Education** (Empower research culture)
"Teaching professionalism is really important we could not now depend on role models." (Focus Group 2.2: Female-Professor)	**Professionalism** (Teaching & assessing professionalism)
"It is important to look in the implementation of students' support system through situation analysis or KAP studies." (Focus Group 2.2: Male-Professor)	**Students Selection, Support, and Behavior** (Implementation of students support system)
"What can be done to change some students' Behavior like Smoking within students." (Focus Group 2.1: Female-Assistant professor)	**Students Selection, Support, and Behavior** (Smoking within students)
"Medical colleges are overwhelmed by females with less percentage of males, does it affect the service, what are the causes and solutions?" (Focus Group 2.2: Male-Associate professor)	**Students Selection, Support, and Behavior** (Admission policy)
"How to make use of Simulation with different fidelities and low cost?" (Focus Group 1.1: Female-Associate professor)	**Simulation** (Developing innovative low-cost simulation)
"I like to evaluate using technology in teaching ophthalmology as low cost simulation." (Focus Group 2.1: Female-Professor)	**Technology in Education** (Using technology as low-cost simulation)

focus groups allowed an effective application of constant comparison and framework analysis and strengthened the reliability of the study through triangulation.

The emerging themes and what each theme stands for will be described in this section. For each theme, we will first discuss subthemes that are common to both participants' groups, followed by experts' and learners' perspectives. The relevance to the alumnae research will be identified, and the similarities and differences relating to published work reviewed in the literature will be highlighted.

4.1. Curriculum content design and delivery

This theme signifies that participants are concerned to check if the current curriculum adequately prepares students for practice, taking account of contents, method, and process. Assessment of needs is seen as an important preliminary step in designing curricula and appeared as priorities by the two groups of Informants. Participants also

TABLE 3: Research priorities for ME Master's students in Sudan a set of 10 themes and 63 subthemes.

Theme	Subtheme
Curriculum Content Design & Delivery	· Effectiveness of community based learning · Integration of basic and clinical sciences · Assessing curricula alignment · Need assessment · Effectiveness of PBL & TBL · How to make use of the Lecture? · Accommodating new subspecialties · Types of curricula used · Peer learning · Involving students in their learning · Outcomes of clinical learning
Faculty Development	· Assessment of faculty needs · Qualifications of teachers · Driving factor for retention & migration · Implementing appraisal of staff · Effect of academic leadership on staff satisfaction · Faculty training on: Curriculum design Leadership OSCE and other assessment, Research supervision Technology Education mentorship
Assessment Methods	· Assessment methodology · Implementation of Blue print · Psychometric analysis · Exploring assessment Tools · OSCE implementation · Implementation of standard setting · Perception of students · Evaluation of log book
Research in Medicine & ME	· Assessment of supervisor needs · Use of qualitative research · Building capacity through external collaboration & international links · Empower research culture · Ethics in educational research · Research barrier & motivators · Supporting student research attitude · Foster publications · Integrated research projects
Accreditation, Evaluation & Quality Education	· Awareness about & implementation of quality parameters · Awareness about accreditation & internal evaluation · Needs assessment of external assessors · Impact of multiplication of schools & measures to maintain and improve quality · Setting national standard competences frame work · Implementation of self-assessment · Evaluating quality of clinical programmes · Evaluating of postgraduate courses
Professionalism	· Contextualized professionalism competences · Teaching & assessing professionalism · Implementation of professionalism courses · Raising awareness of teachers on their role as role models · Hidden curriculum
Students Selection Support & Behaviour	· Implementation of student support system · Polling on students · Smoking within students · Admission policy
Simulation	· Embowering current use of simulation · Developing innovative low cost simulation
Technology in Education	· Effectiveness of virtual museum · Using technology as low cost simulation · Technology for remote education
Social Accountability of Medical Schools	· Documentation of social accountability · Redefining excellence in terms of social accountability

considered the effectiveness of small group models of teaching, for example, problem-based learning (PBL) and team-based learning (TBL).

Experts thought of how to make the most of the lecture which is still one of the important methods of teaching in Sudan. They considered looking into different models

and levels of integration. They also highlighted the need to investigate the community-oriented ME strategy practiced in Gezira University for >40 years in a socially accountable model that acknowledges inter-professional education.

Learners added subcategories, for example, the types of curricula currently used and peer learning which is informally practiced in some schools. This theme is the most studied by alumnae, which highlights the relative alignment of previous research activities with the preferences of stakeholders. There is also considerable prioritization of this theme in all PSE reviewed and in a recent study conducted in an Australian University [39, 40].

4.2. Faculty development

This theme represents how participants support and value the role of trainers and efforts specified to evaluate or develop their skills, knowledge, behaviors, and practices as educators. The most frequently mentioned subcategories by experts and learners are “driving factors for retention and migration” and “faculty training” in various aspects of ME.

Noticeably, Sudan is facing a huge wave of brain drain which has now existed for >40 years in Gulf countries and the Western world. This might be economic and/or political in origin and is possibly aggravated by the continuous expansion in the medical and education sectors in Gulf countries, which create a continuous demand on medical educators who master both Arabic and English languages and who are distinguished by the excellence and professionalism. Participants shared the belief that this phenomenon is exhausting to ME in Sudan, hence it is mostly touched in every interview and every focus group. Stakeholders suggested to studying strategies that work best to optimize staff retention along with a comprehensive program of faculty training. The theme of faculty development occupies a central position in our set of priorities, and for each theme recognized as a priority, one or more subthemes concerning staff emerged, see Figure **3**.

Issues of faculty training mentioned by experts are training in curriculum design and leadership, assessing the needs of medical educators, implementation of staff appraisal, qualification of teachers, and the effect of leadership on staff satisfaction. On the other hand, learners mentioned training faculty on technology in education and empowerment of mentorship.

This theme is underrepresented in the alumnae research. Faculty development and staff issues are strongly recommended as priorities in the PSE from developing countries

[10], which echo a similar context to solve some of the future challenges of ME. It also emerged as a priority in a recent study aimed to generate a list of research topics for MER in SSA [41]. However, this is not the case regarding PSE from developed countries, the topic might have been sufficiently addressed previously and is no longer an issue in that part of the world.

4.3. Assessment methods

Indicates the perceived importance of ensuring assessments lead to fitness to practice. Priorities emerged from both groups in this theme focused on exploring assessment tools used in different schools, implementation of standard-setting and Objective Structured Clinical Examination (OSCE).

Most experts argued that OSCE has good face validity but the ability of its current implementation to capture the needed skills and make a decision on fitness for practice is questioned and needs to be studied. They were also concerned about the implementation of blueprint and psychometric analysis.

Learners were concerned about the need to study performance assessments such as workplace-based assessments that enhance clinical skills and ensure patients' safety [42, 43]. In Sudan, the logbook continues as a tool for assessing clinical skills in the workplace, and these methods are not currently operated.

Alumnae had reasonably contributed to this area, they looked into clinical assessment, validity, and reliability, and students' and staff's perception of some methods. This area enjoyed wide citation in the international literature, calling for more evidence surrounding the role and value of assessments. In the PSE performed in Scotland, the role of assessment had scored the highest perceived importance, while it appeared frequently in the studies from the developing countries. Moreover, the assessment of professionalism appears as a priority in Canadian and New Zealand studies.

4.4. Research in medicine and ME

Reflects the informants' concerns about the challenges that must be explored to promote research practice. Concerns have been raised by both groups about looking into how to empower research culture and investigate barriers and promoters.

From the experts' point of view, building capacity through external collaboration and international links was felt to be a necessary step to foster the national research, an issue stressed by Amini et al. [17]. They cited the importance of assessing the needs

of research supervisors to improve their abilities, experts also like to survey the use of qualitative research as an unfamiliar approach to health professionals.

Many of the learners were calling for bigger integrated research projects and institutionalization of themes linked to the needs and mission of individual institutions. The young researchers also find supporting students' research attitudes important.

This theme was not endorsed by Master's students although it achieves the highest weight by the learners, this justifies the need for an organized priority setting. The increasing demands for a national and international collaborative approach in research appeared in most international recommendations [18, 19].

4.5. Accreditation, evaluation, and quality education

This theme shows that participants are interested to incorporate topics that promote quality education, and are concerned about the challenges that must be negotiated to facilitate educational evaluation, audit, and accreditation [6, 44]. Priorities identified by both groups in this theme focused on setting the national standard competencies framework.

Experts like to assess the impact of the increasing number of medical schools and the measures to maintain and improve quality, and to assess the needs of faculty as external assessors to support them appropriately. Redefining excellence in terms of social accountability and checking the awareness of faculty about accreditation, internal evaluation is also a priority for them.

Again, this theme was not approached by Master's students although it attains the highest weight by experts. Similarly, it didn't appear as a priority in the reviewed PSE from the developed nations while "quality management in education" is a principal priority theme for the Iranian study by Tootoonchi et al. [10], and a subtheme by the other two studies from developing world.

4.6. Professionalism

It represents the informants' interest in issues around understanding the acquisition of professional behavior and how these competencies could be taught, learned, and assessed, advocating international calls for doctors to be good care providers, respectful of patient autonomy, and social justice.

Teaching and assessing professionalism was cited by most participants as a priority, an aspect of ME that receives increasing emphasis [45, 46]. They are also concerned

about the implementation of professional courses. While experts like to develop contextualized professionalism competencies, learners spoke of ways to raise awareness of teachers on their role as role models and investigate the hidden curriculum and its significant effects on shaping professional attitudes.

Professionalism was the focus of two alumnae studies and appeared as a principal theme universally in the reviewed studies. A better understanding of the acquisition of professional behavior and how we can effectively and efficiently teach, learn, and assess these competencies was spoken of in various ways [47].

4.7. Student selection support and behavior

This theme includes ideas that show the participants' concern about how students are selected and supported academically, socially, and psychologically throughout their medical studies. It was not addressed by experts but emerged as a priority for learners, the reason may be related to their close contact with students and their problems.

Another issue that might be peculiar to Sudan is that medical schools are noticed to be markedly dominated by the female gender. An explanation of this phenomenon and inquiry about its causes and effects merit attention as considered by learners. Student selection was prioritized and appeared in the subthemes and recommendations of the Canadian study [19], and trainee support appeared as a priority in the Scotland study [14].

4.8. Simulation in ME

Encompasses study areas that empower the use of simulation in ME negotiating its challenges. Experts prioritized exploring and empowering the current use of simulation. And learners considered developing innovative low-cost simulation models. The theme was not studied by alumnae of ME Master's programs. Simulation is a fertile area for potential research as there is an increasing need for teaching and examining in a structured and controlled environment, with challenging issues such as the cost and the impact of simulation training on long-term skill acquisition [48, 49]. However, the theme did not appear as a priority for the international exercises reviewed.

4.9. Technology in education

Reflects the participants' concerns that ME can efficaciously incorporate new technologies which are continuously evolving. Experts are concerned about examining the effectiveness of virtual museums and pathology specimens, while learners suggested interrogating the use and cost-effectiveness of computer-based virtual reality simulators in teaching and examining students [50]. They also want to examine using E-learning technologies in teaching basic medical sciences, especially for remote schools. The use of technology and its impact was prioritized and appeared in the subthemes and recommendations of the Canadian study [19].

4.10. Social accountability of medical schools

Concerns with understanding the conformity and compliance of medical schools with social accountability principles, and how to acknowledge, address, and promote this concept. This theme was discussed by experts only. Their view is that Sudan's medical schools' social accountability should be subject to reflection, documentation, and empowerment. This theme appeared as an important priority for the Canada study [19], but not for the other international studies.

4.11. Significance and impact

While the list of research priorities that emerged is not claimed to be comprehensive, it would make potential researchers conscious of the most important problems in the ME field and the questions that should be answered with sensible ownership of these priorities [14]. It may hence result in high-quality research by augmenting the rigor they would devote to their research effort. It is also expected that the exercise will permit the new researchers to attach relevance and meaning to their learning of the researching skills, other than being only a requisite for their degree fulfillment, hence supporting lifelong interest in academic inquiry [51, 52], nurturing the eagerness to continue researching, and becoming professional educators [53]. The study may encourage senior researchers to innovate practices that could support MER culture in the country [54].

Although our product is planned to inform ME Master's students, it is valid across the country and could inform other researchers, medical institutions, and policymakers. It may also persuade funders to see the relevance of such research to the future health

of the population. The results and the procedure may be transferable to other countries with similar circumstances [20].

5. Limitations

We have included numbers quantifying qualitative themes, despite different epistemological perspectives associated with quantitative and qualitative approaches. However, eminent qualitative researchers have supported operating the advantages of quantitative research, with an aptitude to assess the amount of evidence on and against a particular conclusion, while retaining a qualitative perspective [55–57].

We could not claim that this study is globally generalizable as there are significant differences in medical schools and healthcare systems around the world, but since the international regulatory processes will be common to all countries by 2023 [58], we could argue that some prioritization could be applicable worldwide.

6. Implications for further research

This PSE offers the essential first step to inspire MER in Sudan as a discipline and motivate focused systematic efforts that encourage developing research culture. Further studies to ascertain the obstacles and measures to overcome them are needed. A similar exercise could be repeated to check for emerging priorities. Each suggested subtheme is likely to stimulate research questions and each theme to identify potential projects with collated key research ideas for collaborative work, making linkages and building on these priority-setting experiences and new initiatives.

7. Conclusion

The current study generated a set of priorities composed of seven principal themes and three minor themes encompassing sixty-three subthemes.

The principal themes identified are:

(i) Curriculum Content Design and Delivery

(ii) Faculty Development

(iii) Assessment Methods

(iv) Research in Medicine and ME

(v) Accreditation, Evaluation, and Quality Education

(vi) Professionalism

(vii) Student Selection Support and Behavior

This study fulfilled its aim of developing a systematic and transparent approach to providing a platform of evidence about MER topics selection for Masters' students and beyond. It could lead future researchers to choose relevant themes with valuable outcomes. The findings of our study congruent with many findings from other countries, however, our participants identified areas of priorities that did not attain significant prioritization from other studies. This suggests that there are many key priorities that are relevant at a more international level, while other priorities may be nation-specific. Although themes studied by ME Masters' alumnae have some consistency with the current study, many areas are not approached yet. We also identified four "Why themes" or reasons for participants to select these topics. These priorities possess great potential to positively influence choices about research foci [41], improve the mandatory MER effectiveness contributing to the enhancement of future health education outcomes, and may improve community health.

The following recommendations are drawn from the current study:

(i) Medical educators, policymakers, and academic administrators are encouraged to use these research priorities in decision-making about future projects.

(ii) A future comparison between the study outcomes and the submitted researches and their impact could validate the priority-setting process and its influence on policy and practice.

(iii) It is necessary to frequently determine research needs and priorities.

(iv) Establishing a body to coordinate joint programs in MER to facilitate the research process, quality, and productivity and invite international links.

8. Acknowledgements

The article is drawn from the dissertation submitted to the University of Dundee in partial fulfillment of the requirements of the Master's degree in ME. The author acknowledges the unlimited support by Dr Linda Jones and the academic and administrative staff of the Centre of Medical Education at the School of Medicine – The University of Dundee for their great help during the author's study.

The author is also grateful to the participants and their program heads appreciating their collaboration.

9. Ethical Considerations

Ethical approval was secured from the University of Dundee Research Ethics Committee through School Research Ethics Committee. The researcher obtained permission to approach and recruit participants from the Sudan Medical Specialization Board Ethics Committee which facilitated obtaining permissions from the heads of the two Masters' programs involved in the study.

10. Competing Interests

None declared.

11. Availability of Data and Material

Data and data tools for this study are available on reasonable request from the authors.

12. Funding

None.

References

[1] Fahal, A. H. (2007). Medical education in the Sudan: its strengths and weaknesses. *Medical Teacher*, vol. 29, no. 9, pp. 910–914.

[2] World Health Organization. (2015). *Review of medical education in the Eastern Mediterranean Region*. WHO.

[3] Obeidat, A. S., Alhaqwi, A. I., and Abdulghani, H. M. (2015). Reprioritizing current research trends in medical education: a reflection on research activities in Saudi Arabia. *Medical Teacher*, vol. 37, no. 1, pp. S5–S8.

[4] Karrar, Z. (2018). Personal communication.

[5] Sudan Medical Council. (2006). *Accredutation of medical schools*. Sudan Medical Council.

[6] Karle, H. (2006). Global Standards and accreditation in medical education: A view from the WFME. *Academic Medicine*, vol. 81, no. 12, pp. S43–S48.

[7] World Federation for Medical Education. (2018). *Sudan medical council awarded wfme recognition status* [Press Release]. World Federation for Medical Education.

[8] Greysen, S. R., Dovlo, D., Olapade-Olaopa, E. O., et al. (2011). Medical education in sub-Saharan Africa: a literature review. *Medical Education*, vol. 45, no. 10, pp. 973–986.

[9] Lam, T. P. and Lam, Y. Y. B. (2009). Medical education reform – The Asian experience. *Academic Medicine*, vol. 84, no. 9, pp. 1313–1317.

[10] Tootoonchi, M., Yamani, N., Changiz, T., et al. (2012). Research priorities in medical education: A national study. *Journal of Research in Medical Sciences*, vol. 17, no. 1, pp. 83–91.

[11] Boney, O., Bell, M., Bell, N., et al. (2015). Identifying research priorities in anaesthesia and perioperative care: final report of the joint National Institute of Academic Anaesthesia/James Lind Alliance Research Priority Setting Partnership. *British Medical Journal Open*, vol. 5, no. 12, p. e010006.

[12] Chalmers, I. and Glasziou, P. (2009). Avoidable waste in the production and reporting ofresearch evidence. *Lancet*, vol. 374, no. 9683, pp. 86–89.

[13] Ajjawi, R., Barton, K. L., Dennis, A. A., et al. (2017). Developing a national dental education research strategy: priorities, barriers and enablers. *British Medical Journal Open*, vol. 7, no. 3, p. e013129.

[14] Dennis, A. A., Cleland, J. A., Johnston, P., et al. (2014). Exploring stakeholders' views of medical education research priorities: a national survey. *Medical Education*, vol. 48, no. 11, pp. 1078–1091.

[15] Nabeie, P., Amini, M., Ghanavati, S., et al. (2016). Research priorities in medical education at Shiraz University of Medical Sciences: Categories and subcategories in the Iranian context. *Journal of Advances in Medical Education & Professionalism*, vol. 4, no. 1, pp. 26–32.

[16] Ball, L., Barnes, K., Laur, C., et al. (2016). Setting priorities for research in medical nutrition education: an international approach. *BMJ Open*, vol. 6, no. 12, p. e013241.

[17] Amini, M., Kojuri, J., Lotfi, F., et al. (2012). Research priorities in medical education in the Eastern Mediterranean Region. *Eastern Mediterranean Health Journal*, vol. 18, no. 7, pp. 687–692.

[18] Wilkinson, T. J., Weller, J. M., McKimm, J., et al. (2010). Programmatic research in New Zealand medical education: A national collaboration. *New Zealand Medical Journal*, vol. 123, no. 1318, pp. 24–33.

[19] Hodges, B. D., Albert, M., Arweiler, D., et al. (2011). The future of medical education: A Canadian environmental scan. *Medical Education*, vol. 45, no. 1, pp. 95–106.

[20] Rees, C. E. and Monrouxe, L. V. (2010). Theory in medical education research: How do we get there? *Medical Education*, vol. 44, vol. 4, pp. 334–339.

[21] Stalmeijer, R. E., McNaughton, N., and Van Mook, W. N. K. A. (2014). Using focus groups in medical education research: AMEE Guide No. 91. *Medical Teacher*, vol. 36, no. 11, pp. 923–939.

[22] Watling, C. J. and Lingard, L. (2012). Grounded theory in medical education research: AMEE Guide No. 70. *Medical Teacher*, vol. 34, no. 10, pp. 850–861.

[23] Tavakol, M. and Sandars, J. (2014). Quantitative and qualitative methods in medical education research: AMEE Guide No 90: Part I. *Medical Teacher*, vol. 36, no. 9, pp. 746–756.

[24] Cleland, J. (2015). Exploring versus measuring considering the fundamental differences between qualitative and quantitative research. In J. A. Cleland and S. J. Durning (Eds.), *Researching medical education*. Chichester, West Sussex: John Wiley and Sons, Inc.

[25] &&&&Bowen, G. A. (2005). Preparing a Qualitative Research-Based Dissertation: Lessons Learned.;10(2):208-22.

[26] Harvey, N. and Holmes, C. A. (2012). Nominal group technique: An effective method for obtaining group consensus. *International Journal of Nursing Practice*, vol. 18, no. 2, pp. 188–194.

[27] Cohen, L., Manion, L., and Morrison, K. (2018). Validity and reliability. In L. Cohen, L. Manion, and K. Morrison (Eds.), *Research methods in education* (8^{th} ed). London and New York: Routledge.

[28] Ng, S., Lingard, L., and Kennedy, T. J. (2014). Qualitative research in medical education Methodologies and methods. In T. Swanwick (Ed.), *Understanding medical education: Evidence, theory, and practice* (2^{nd} ed., pp. 371–384). Chichester: Wiley-Blackwell.

[29] Albert, M., Hodges, B., and Regehr, G. (2007). Research in medical education: Balancing service and science. *Advances in Health Sciences Education*, vol. 12, no. 1, pp. 103–115.

[30] O'Reilly, M. and Parker, N. (2012). 'Unsatisfactory Saturation': A critical exploration of the notion of saturated sample sizes in qualitative research. *Qualitative Research*, vol. 13, no. 2, pp. 190–197.

[31] Starks, H. and Brown Trinidad, S. (2007). Choose your method: A Comparison of phenomenology, discourse analysis and grounded theory. *Qualitative Health Research*, vol. 17, no. 10, pp. 1372–1380.

[32] Cote, L. and Turgeon, J. (2005). Appraising qualitative research articles in medicine and medical education. *Medical Teacher*, vol. 27, no. 1, pp. 71–75.

[33] Qualitative data. (2014). In M. Denscombe (Ed.), *The good research guide for small-scale research projects – Open up study skills* (5^{th} ed., pp. 250–273). Maidenhead, Berkshire: McGraw-Hill Education.

[34] Donovan, J. and Sanders, C. (2005). Key issues in the analysis of qualitative data in health services research. In A. Bowling and S. Ebrahim (Eds.), *Handbook of health research methods: Investigation, measurement and analysis* (pp. 515–553). Maidenhead: Open University Press.

[35] Ritchie, J. and Spencer, L. (1994). Qualitative data analysis for applied policy research. In A. Bryman and R. Burgess (Eds.), *Analyzing qualitative data* (pp. 173–194). Routledge.

[36] Robson, C. (2002). The analysis of qualitative data. In C. Robson (Ed.). *Real world research: A resource for social scientists and practitioner-researchers* (2nd ed., pp. 455–499). Blackwell.

[37] Pope, C., Ziebland, S., and Mays, N. (2000). Qualitative research in health care: Analysing qualitative data. *British Medical Journal*, vol. 320, no. 7227, pp. 114–116.

[38] WNO. (2016). Education Development and Research Centre (EDC -Gezira). In *UoG Fom*. Sudan Currncy Printing Press.

[39] Grant, J. (2002). Learning needs assessment: assessing the needs. *British Medical Journal*, vol. 324, pp. 156–159.

[40] Palermo, C., King, O., Brock, T., et al. (2019). Setting priorities for health education research A mixed methods study. *Medical Teacher*, vol. 41, no. 9, pp. 1029–1038.

[41] Van Schalkwyk, S. C., Kiguli-Malwadde, E., Budak, J. Z., et al. (2020). Identifying research priorities for health professions education research in sub-Saharan Africa using a modified Delphi method. *BMC Medical Education*, vol. 20, no. 1, p. 443.

[42] Norcini, J. (2014). Workplace assessment. In: T. Swanwick (Ed.), *Understanding medical education: Evidence, theory and practice* (2nd ed., pp. 279–292). ASME, Welly Blackwell Publishing.

[43] Norcini, J. and Burch, V. (2007). Workplace-based assessment as an educational tool: AMEE Guide No. 31. *Medical Teacher*, vol. 29, no. 9, pp. 855–871.

[44] Dubrowski, A. and Morin, M.-P. (2011). Evaluating pain education programs: An integrated approach. P*ain Research and Management*, vol. 16, no. 6, pp. 407–410.

[45] Chandratilake, M., McAleer, S., and Gibson, J. (2012). Cultural similarities and differences in medical professionalism: A multi-region study. *Medical Education*, vol. 46, no. 3, pp. 257–266.

[46] Monrouxe, L. V. (2010). Identity, identification and medical education: Why should we care? *Medical Education*, vol. 44, no. 1, pp. 40–49.

[47] Wilkinson, T. J. and Wade, W. B. (2009). A blueprint to assess professionalism: Results of a systematic review. *Academic Medicine*, vol. 84, pp. 551–558.

[48] McGaghie, W. C., Issenberg, S. B., Cohen, E. R., et al. (2011). Does simulation-based medical education with deliberate practice yield better results than traditional clinical education? A meta-analytic comparative review of the evidence. *Academic Medicine*, vol. 86, no. 6, pp. 706–711.

[49] McGaghie, W. C., Issenberg, S. B., Petrusa, E. R., et al. (2006). Effect of practice on standardised learning outcomes in simulation-based medical education. *Medical Education*, vol. 40, no. 8, pp. 792–797.

[50] Cook, D. A., Hatala, R., and Brydges, R. (2011). Technology-enhanced simulation for health professions education. *JAMA*, vol. 306, no. 9, pp. 2011–1234.

[51] Kaufman, D. M. (2003). ABC of learning and teaching in medicine. Applying educational theory in practice. *BMJ*, vol. 326, pp. 213–216.

[52] Biggs, J. and Tang, C. (2011). *Teaching according to how student learn teaching for quality learning at university: What the student does?* (4th ed). McGraw-Hill Education.

[53] Van Der Vleuten, C. P. M., Dolmans, D. H. J. M., and Scherpbier, A. J. J. A. (2000). The need for evidence in education. *Medical Teacher*, vol. 22, no. 3, pp. 246–250.

[54] O'Brien, J. M. (2015). Conceptualizing the research culture in postgraduate medical education: Implications for leading culture change. *Journal of Medical Humanities*, vol. 36, no. 4, pp. 291–307.

[55] Maxwell, J. A. (2010). Using numbers in qualitative research. *Qualitative Inquiry*, vol. 16, no. 6.

[56] Illing, J. (2014). Thinking about research: Theoretical perspectives, ethics and scholarship. In *Understanding medical education* [Internet] (2nd ed., pp. 331–348). Wiley-Blackwell.

[57] Rees, C. E., Francis, B., and Pollard, A. (2015). The state of medical education research: What can we learn from the outcomes of the UK Research Excellence Framework? *Medical Education*, vol. 49, no. 5, pp. 446–448.

[58] World Federation for Medical Education and the Foundation for Advancement of International Medical Education and Research. (2016). *World Directory of Medical Schools* [Internet]. Available from: https://search.wdoms.org/